

## **Comparative Study of Platelet Rich Plasma, Povidone Iodine And silver Sulfadiazine Dressing In Management of Burns**

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### **Abstract**

**Background:** Burn injury occurs in all age groups, from many causes, and may range from the very minor, when no or self-treatment is sufficient, through to the most severe requiring the highest levels of intensive care and surgery.

**Methods:** A comparative study of platelet rich plasma, povidone iodine and silver sulfadiazine dressing in management of burns and chronic ulcers carried in prospective manner on cases admitted in various surgical wards and burn ward of M. G. Hospital attached to Dr. S. N. Medical College, Jodhpur from the period of January, 2016 till December, 2016.

**Results:** It was found that majority of patients (55%) had 20-40% burns. 7 patients (17.50%) had 40-50% burns, 6 patients (15%) had 50-60% burns and 5 patients (12.5%) had less than 20 burns. 13 patients in group-A, 3 patients in group-B and 5 patients in group C improvement was seen 76-99%.

**Conclusion:** It is concluded from this study that in burns dressing by platelet rich plasma in comparison

with povidone iodine and silver sulfadiazine is very useful by preventing exogenous infections, by promoting rapid epithelialization, by reducing cost, pain and sufferings associated with repeated change of burn dressings and by preventing exudation from raw areas.

**Keywords:** Burns, plasma rich protein, povidone iodine, silver sulfadiazine

### **Introduction**

Burn injury occurs in all age groups, from many causes, and may range from the very minor, when no or self-treatment is sufficient, through to the most severe requiring the highest levels of intensive care and surgery. Thus, patients suffering from burn injury present with a wide spectrum of injury severity depending on the depth of the wound and the surface area of the body affected. This variability of injury makes it difficult to accurately describe the number of people who suffer burn injuries each year, only the

most serious are admitted to hospital and these are the least common of burn injuries.<sup>1-2</sup>

**Platelet Rich Plasma:** PRP is platelet-rich plasma also known as platelet concentrates (PCs), autogenous platelet gel (APG), plasma very rich in platelet (PVRP) and platelet rich growth factor (PRGF). PRP gel contains high concentrations of platelet and natural fibrinogen to a lesser extent. The properties of PRP are in fact based on the production and release of several growth factors due to the activation of platelets. Release of growth factors occurs within 10 minutes from the onset of blood clot formation. By activation of platelets, their alpha granules are ruptured within 3-5 days. The released growth factors based on their half-life exert their primary proliferative effects maximally within 10 days. Normal blood platelet count is 1,50,000 - 4,50,000. In different PRP preparation systems, platelet concentration increases by 160-740%. Typically, to achieve the therapeutic effects of PRP, 400 to 500% increase in number of platelets (1,000,000/ml) is required.

**Povidone Iodine-** Povidone-iodine is a broad spectrum antiseptic for topical application in the treatment and prevention of wound infection.

It is an iodine preparation formed by complex of P.V.P. (Polyvinyl pyrrolidone) and iodine. It is soluble in water and is free from side effects of inorganic iodine. It has rapid lethal action on bacteria in less than a minute's time and till date no strain of bacteria has developed resistance to this complex compound, but has side effects of sensitivity and iodine burns occasionally.

**Silver Sulfadiazine:** This preparation is a sulfonamide that acts on the bacterial cell membrane and cell wall. Used topically as 1% cream, is active against a large number of bacteria and fungi, even pseudomonas. It

slowly releases silver ions (Ag<sup>+</sup>) which are responsible for antimicrobial action. It is one of the most effective drug for preventing infection of burnt surfaces and chronic ulcers. Local side effects are burning sensations and itching. Up to 10% sulfadiazine may be absorbed systemically and produces its own side effects.

This study was conducted to evaluate and compare the effect of platelet rich plasma, povidone iodine and silver sulfadiazine along with appropriate antibiotics in healing of burns. Hence to promote and shorten the convalescence which will then help in the physical, social, psychological and economical rehabilitation of patient.

### **Material and Methods**

A comparative study of platelet rich plasma, povidone iodine and silver sulfadiazine dressing in management of burns and chronic ulcers carried in prospective manner on cases admitted in various surgical wards and burn ward of M. G. Hospital attached to Dr. S. N. Medical College, Jodhpur from the period of January, 2016 till December, 2016.

A careful and thorough pretreatment history regarding age, sex, occupation, etiological factors, associated medical problem, hypertension, diabetes, previous operations, dietary habits and addiction was elaborated and was followed by physical examination of each patient. Patient particular with reference to age, sex, occupation, clinical presentation, investigations performed, and treatment carried out were recorded. Post treatment complications and outcome were enlisted.

Burn patients were grouped under two heads according to depth and degree of burn.

#### **1. Superficial Burn**

- A. Clean Burn wound
- B. Contaminated Burn wound

## 2. Deep Burn

Excluded from study.

### *Superficial partial-thickness burns*

The damage in these burns goes no deeper than the papillary dermis. The clinical features are blistering and/or loss of the epidermis. The underlying dermis is pink and moist. The capillary return is clearly visible when blanched. There is little or no fixed capillary staining. Pinprick sensation is normal. Superficial partial-thickness burns heal without residual scarring in 2 weeks.

The treatment is non-surgical.

### *Deep partial-thickness burn*

These burns involve damage to the deeper parts of the reticular dermis. Clinically, the epidermis is usually lost. The exposed dermis is not as moist as that in a superficial burn. There is often abundant fixed capillary staining, especially if examined after 48 hours. The color does not blanch with pressure under the examiner's finger. Sensation is reduced, and the patient is unable to distinguish sharp from blunt pressure when examined with a needle. Deep dermal burns take 3 or more weeks to heal without surgery and usually lead to hypertrophic scarring).

### *Full-thickness burns*

The whole of the dermis is destroyed in these burns. Clinically, they have a hard, leathery feel. The appearance can vary from that similar to the patient's normal skin to charred black, depending upon the intensity of the heat. There is no capillary return. Often, thrombosed vessels can be seen under the skin. These burns are completely anaesthetised: a needle can be stuck deep into the dermis without any pain or bleeding.

All patients of chronic ulcers and burns were selected at random in all age groups and both sexes to avoid

selection bias. These patients were divided into three treatment groups i.e. A & B.

Group A : Patients are locally dressed with platelet rich plasma (PRP).

Group B : Patients are locally dressed with povidone iodine.

Group C : Patients are locally dressed with silver sulfadiazine.

## Results

The most commonly affected age group of male and female was, 2<sup>nd</sup> to 4<sup>th</sup> decade. Male-female ratio was 1.35:1.

Table No. 1: Organism Grown In Culture of Discharge

S. No.	Organism Grown	No of patients
1.	Staph. Aureus	17
2.	Pseudomonas	17
3.	Klebsiella species	6
4.	Proteus species	3
5.	E.coli.	0
6.	Streptococcus pyogen	0
7.	Sterile	3
	Total	46

The most common organism isolated by culture was Staph. aureus found in 17 patients. Next common organism was Pseudomonas in 17 patients. Other organisms grown on culture was Klebsiella (6 patients), Proteus (3 patients). 3 patients had sterile discharge on culture.

Table No. 2: Duration of Hospital Stay

Hospital Stay (in days)	Group A	Group B	Group C
0-10	5	1	2
11-20	13	3	4
21-30	2	2	1
31-40	0	3	1
>40	0	1	2
Total	20	10	10
Average days	16	21	24.3

Average duration of hospital stay in group A was 16 days, in group B was 21 days, and in Group C was 24.3 days. Maximum average duration of hospital stay was with group C Patients. In our setup major limiting factor to estimate exact duration of complete healing as patient's request to discharge as soon as they had symptomatic improvement and ulcer started showing signs of healing.

Table No. 3: Improvement (In Percentage) In Cases of Burns

Group	Average improvement in burns at the termination of treatment (based on clinical observation) by Group				Total No. of patients
	Upto 25% (No. of patients)	26-50% (No. of patients)	51-75% (No. of patients)	76-99% (No. of patients)	
A	1	4	2	13	20
B	0	5	2	3	10
C	2	2	1	5	10
Total	3	11	5	21	40

In present study, 13 patients in group-A, 3 patients in group-B and 5 patients in group C improvement was seen 76-99%.

Table No. 4: Distribution of Patients According To Percentage of Burns

S. No.	Percentage of Burns	Group A	Group B	Group C	Total
1	Upto 20%	4	0	1	5
2	21-30%	5	4	2	11
3	31-40%	7	1	3	11
4	41-50%	2	3	2	7
5	51-60%	2	2	2	6
	Total	10	10	10	40

It was found that majority of patients (55%) had 20-40% burns. 7 patients (17.50%) had 40-50% burns, 6

patients (15%) had 50-60% burns and 5 patients (12.5%) had less than 20 burns.

### Discussion

The prospective study was concluded at Mahatma Gandhi Hospital, Dr. Sampurnanand Medical College, Jodhpur. 40 patients of burns admitted during the period from January, 2016 to December 2016 were analyzed in this study. Because of paucity of literature comparison of results with other studies could not be possible for every observation but tried wherever literature available.

Although no major adverse effect was observed by local dressing with Platelet rich plasma, povidone iodine, and silver sulfadiazine, Most common adverse effect observed was burning sensation which was most commonly observed with povidone iodine but occurred with other treatment groups also. Next common side effect observed was itching, most commonly with silver sulfadiazine application. Serious side effects like rashes, leucopenia and anaphylaxis were not observed in any patient with any treatment group.

### Conclusion

It is concluded from this study that in burns dressing by platelet rich plasma in comparison with povidone iodine and silver sulfadiazine is very useful by preventing exogenous infections, by promoting rapid epithelialization, by reducing cost, pain and sufferings associated with repeated change of burn dressings and by preventing exudation from raw areas.

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